

# Linking Teacher and Student Data To Improve Teacher and Teaching Quality

March 2007

By Barnett Berry, Ed Fuller and Cynthia Reeves, Center for Teaching Quality;  
Elizabeth Laird, National Center for Educational Accountability, Data Quality Campaign

Over the last 15 years, researchers have demonstrated the powerful effects that teachers can have on increasing student achievement. In 1991, Harvard economist Ron Ferguson concluded from his research in Texas that “good teachers [as measured by their certification and experience] have distinguishable impacts on student exam scores.” Later, William Sanders, using his value-added methodology, found that the “single largest factor affecting academic growth of populations of students is differences in effectiveness of individual classroom teachers.”<sup>1</sup>

However, distilling *how* teachers influence learning is much more difficult, and even impossible, if teacher, school and student data systems are not linked. Connecting student information with teacher preparation, instructional practices, professional development and working conditions is essential to understanding how and why teachers are able to improve student outcomes.

## Highlights

In this brief, find out more about:

- ▶ the benefits of connecting teacher and student data;
- ▶ important metrics for improving teacher quality and retention;
- ▶ how to develop comprehensive teacher data systems;
- ▶ four states that are leveraging teacher/student data connections
  - Virginia: using data to improve teacher preparation
  - Delaware: improving accountability reporting and schools
  - Ohio: using value-added analysis to inform instruction
  - Colorado: communicating and building on other states' good work to establish a unique teacher ID;
- ▶ the benefits and challenges of value-added measurement; and
- ▶ further reports and resources you can use for additional information on linking teacher and student data to improve teacher quality and student achievement.

## New Policy Priorities and Inadequate Data Systems: The Challenges Facing States

The federal No Child Left Behind (NCLB) legislation calls for all teachers to be “highly qualified” by the end of the 2006–07 school year. Although NCLB leaves it up to the states to define what it means to be “highly qualified,” it does mandate that states examine and eliminate out-of-field and emergency teacher credentialing and ensure that economically disadvantaged and minority children, in particular, are not taught by inexperienced, unqualified or out-of-field teachers at higher rates than

other children.

As they try to implement the law and make more informed decisions, policymakers have few good alternatives for teacher accountability reporting, much less more timely access to robust teacher quality analysis. A

<sup>1</sup>University of Tennessee Value-Added Research and Assessment Center, Sanders, W.L. and J.C. Rivers, *Cumulative and Residual Effects of Teachers on Future Student Academic Achievement*, 1996.

recent U.S. General Accounting Office report found that “states do not have the teaching quality data infrastructures that would allow them to track teacher qualifications according to the federal criteria for each subject taught.”<sup>2</sup>

Universities, state departments of education, higher education agencies, professional standards commissions and retirement boards have built most of the current teacher data systems separately and for specific purposes. As a result, many of these systems function as discrete and isolated silos of information and exist only to make sure teachers have met minimal licensing standards and have completed that particular state’s prescribed coursework.

Due to the lack of comprehensive statewide longitudinal data systems, most states have allowed districts to self-report NCLB teacher quality data or review transcripts to determine if teachers are highly qualified. In addition, the tremendous variation in states’ definitions

and means of counting highly qualified teachers makes the data virtually unusable at the state and federal policy levels. Finally, the lack of teacher identifiers (IDs) that can be linked to student records limits the capacity of policymakers, practitioners and the public to know not only which teachers are qualified but also which ones are more likely to stay and teach effectively — and why.

New policy questions and accountability demands require better data on teachers and the universities that prepare them, so additional investments are needed to gather, house and analyze data in new ways that inform policy and practice. This issue brief focuses on why it is important to establish statewide longitudinal data systems that include the ability to link teacher, school and student information. It also highlights lessons from states that are in the forefront of building and using these systems.

## Longitudinal Data Systems Needed To Improve Teacher and Teaching Quality

As part of its efforts to encourage state policymakers to support and develop state longitudinal data systems, the Data Quality Campaign promotes the development and use of a teacher ID with the ability to match teachers to students. The unique teacher ID is permanently attached to each individual and is used throughout the data system.

Many states collect data on teacher education and certification, but matching teachers to students by classroom and subject is critical to understanding the connection between teacher training and qualifications and student academic growth. However, only 15 states report being able to connect student and teacher data,<sup>3</sup> and the extent of the analyses that can be performed with this information varies greatly, depending on the sophistication and breadth of the data on teachers and courses taught.

Moreover, seven states do not have unique statewide IDs for their teachers,<sup>4</sup> meaning that if teachers move to another district, their records do not automatically follow, which results in incomplete and redundant information at the state level.

*With a teacher ID and the ability to connect teacher, student and school data, policymakers and educators will know:*

- ▶ which teacher preparation programs produce graduates whose students have the strongest academic growth;

<sup>2</sup>Government Accountability Office, *No Child Left Behind Act: More Information Would Help States Determine Which Teachers Are Highly Qualified*, GAO-03-631, 2003.

<sup>3</sup>Data Quality Campaign, *NCEA Survey of State Data Collection Issues Related to Longitudinal Analysis*, 2006.

<sup>4</sup>*Ibid.*

- ▶ how school working conditions can affect the impact that teacher education has on P–12 student achievement;
- ▶ how the experience levels of the teachers in the district’s high-poverty schools compare with those of teachers in the schools serving affluent students, and how these experience levels are related to the academic growth of the students in their classrooms; and
- ▶ the relationship between the performance of the district’s low-income students on statewide assessments and teacher preparation in the tested subject(s).

Although creating a robust data system with the capacity to match teachers to students is fundamental to school improvement and accountability, there are other key elements of a comprehensive teacher quality data system that include evidence about the preparation, induction, retention, mobility and effectiveness of teachers. Several states — such as Florida, Louisiana, New York, North Carolina, Tennessee, Texas and Utah — already have built fairly sophisticated teacher quality data systems, and other states — such as Virginia — are making progress. In addition to illustrating how to overcome political and technical challenges, these states demonstrate the importance of collecting and using data around the following areas pertaining to teachers:

**Pipeline Data.** Even before they graduate from a teacher preparation program, some student teachers leave. Being able to identify these students and ascertain their reasons for leaving — as well as their initial expectations of the program — will help programs modify the experiences offered to students and, ultimately, expand the pipeline of student teachers.

**Production Data.** Education schools often produce enough new teachers, overall, to meet current demand. However, the teachers they produce may not be prepared to teach in the subjects, grades or locations with

## 10 Essential Elements of a Longitudinal Data System

The Data Quality Campaign has identified 10 essential elements of a longitudinal data system:

1. A unique statewide student identifier that connects student data across key databases and across years
2. Student-level enrollment, demographic and program participation information
3. The ability to match individual students’ test records from year to year to measure academic growth
4. Information on untested students and the reasons they were not tested
5. A teacher ID system with the ability to match teachers to students\*
6. Student-level transcript information, including information on courses completed and grades earned
7. Student-level college readiness test scores
8. Student-level graduation and dropout data
9. The ability to match student records between the P–12 and higher education systems
10. A state data audit system assessing data quality, validity and reliability

*\*States with element #5: Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Mississippi, New Mexico, Ohio, South Carolina, Tennessee, Utah, West Virginia, Wyoming*

the most dire shortages. Better information about the discrepancy between the supply of teachers and the demand of schools will empower stakeholders to address teacher shortages.

**Employment Data.** A relatively large number of teacher education graduates never enter teaching. Analyses of the graduates who choose to enter or not enter the teaching field by specific characteristics and certificate earned can assist programs in identifying trends. In

# Teaching Quality Data Systems Roadmap: [www.teachingdata.org](http://www.teachingdata.org)

The Center for Teaching Quality has created an online roadmap for states and districts to follow as they think through the most effective ways to integrate data systems and teacher quality efforts. The content (e.g., ideas, examples, tools, instruments and methods) described is not intended as a mandate for data collection and analysis. Rather, the purpose is to provide suggestions, both philosophical and technical, about how states, preparation programs and school districts can work collaboratively to build and use a teacher quality data warehouse that ultimately could improve student achievement by creating a better understanding of teacher production, supply, demand, mobility, turnover and quality.

## Examples of Philosophical Principles To Consider

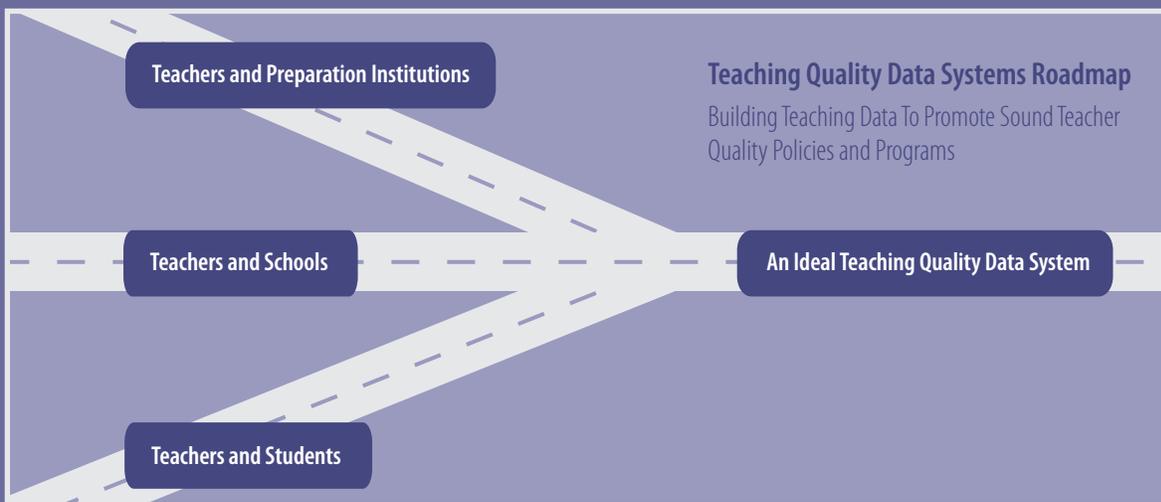
- ▶ Data should not be collected and analyzed to punish individuals, programs or agencies. Rather, data collection and subsequent analyses should be used in formative ways to focus on improvement, in addition to being used for accountability purposes.
- ▶ Due to the complexity of identifying high-performing teachers based on student achievement data, using only student test scores may not be appropriate. Additional or other measures, including both quantitative and qualitative data, provide a more complete picture when making judgments about the effectiveness of teachers, schools and preparation programs.

- ▶ Creating a useful teacher quality data warehouse and system requires the participation of state agencies, preparation programs and school districts. Engaging providers and users of teacher quality data helps ensure that the system efficiently provides data that are user friendly, relevant and timely.

## Examples of Technical Principles To Consider

- ▶ Data need to be longitudinal — following individuals (students and teachers) over time — and of high quality. The foundation of a comprehensive longitudinal teacher quality data system is having unique student and teacher IDs and being able to connect the two.
- ▶ The privacy and security of individual records in the database must be protected.
- ▶ Oversight of the database should be entrusted to a state entity that can enforce security safeguards; assert the authority needed to collect and edit data; add and revise reports as needed; maintain the system; and work effectively across P–12, community college and university organizational boundaries.

*Visit the Center for Teaching Quality Web site for full lists of the principles states should consider as they build these systems: [www.teachingdata.org](http://www.teachingdata.org).*



addition, surveys that ask graduates why they chose not to enter teaching could help identify areas of weakness in the preparation program.

**Working Conditions and Retention Data.** Growing evidence suggests that teachers' working conditions influence both their retention rates and their effectiveness. Center for Teaching Quality research has uncovered strong relationships between teachers' reports on specific working conditions and their school's adequate yearly progress status. In particular, the quality of school leadership, professional development, adequacy of resources, planning time during the day and empowerment are strongly linked to student achievement and teacher retention. In addition, research is showing that the quality of teacher induction programs determines whether or not novices stay in teaching long enough to learn to teach effectively. Collecting data on the type and amount of supports teachers receive can explain their relationship to improving student achievement. North Carolina has begun to systematically and longitudinally assemble data on teacher working conditions. Other states, including Arizona, Mississippi, Nevada and Ohio, are beginning to do so.

**Effectiveness Data.** Many states collect data on teacher education and certification, but matching teachers to students by classroom and subject is critical to identifying which teachers with different types of preparation, certification, etc. are teaching which students and courses. More important, analyzing teacher effectiveness in conjunction with student outcomes illuminates which forms of teacher training and certification have the greatest impact on students' academic growth in the classroom. In a system for assessing teacher effectiveness, three interlocking forms of evidence should be considered:

- ▶ contributions to growth in student learning (including classroom assessments as well as standardized tests, when appropriate);
- ▶ performance on teaching assessments measuring standards known to be associated with student learning; and
- ▶ evaluation of teaching practices that are associated with desired student outcomes and achievement of school goals.

## Linking Teacher and Student Data Systems: Experiences of Four Leading States

Collecting and analyzing data on teacher preparation programs, school districts, schools, teachers and students gives policymakers and practitioners high-quality information to make important decisions. However, policymakers also must realize that creating a teacher quality data system is a time-consuming and expensive process. The process requires a large investment in building the capacity of individuals to collect, analyze,

interpret and communicate data appropriately and meaningfully. Following are examples of four states that have begun to make progress and demonstrate results. These states have been successful because they have clearly communicated the benefits of linking teachers and their students, engaged stakeholders early, and built analyses around the common goal of improving student achievement.

## Data: Integral to Virginia's Efforts To Improve Teacher Preparation

### VITAL (Virginia Improves Teaching and Learning)

Although creating a common ID and linking teacher and student records is a challenge in itself, it is only the first step for making the policy and program changes needed to improve teaching quality. More data about teachers, where they work, and how and where they were prepared is necessary to better understand what makes the most effective teachers successful. Virginia has taken this step with the creation of its VITAL (Virginia Improves Teaching and Learning) system. Through data provided by university-based preparation programs and surveys of both teacher-education students and practicing teachers, the commonwealth will be able not only to know which teachers secure the greatest gains from students, but also to conduct further research into the preparation and support of those educators.

### *Working with Teacher Preparation Programs To Improve Teacher Quality and Retention*

The State Council of Higher Education for Virginia (SCHEV) — in partnership with public and private universities and colleges in the commonwealth — created VITAL, using resources from Virginia's federal Title II Higher Education Act grant. The system will align both the licensure and student information databases to provide the commonwealth and its teacher preparation programs with important information about the effectiveness of those programs. This state-of-the-art system, based on the design of SCHEV's existing student record data collections system, was designed by the VITAL Steering Committee with technical support and implementation by HigherEd.org. It is unique in a variety of ways.

- ▶ **The system provides teacher preparation programs with data they need and the tools to use the information.** All teacher preparation programs submit

data to SCHEV and then can download the information back into reports that they must submit. Most important, the data on program design and teacher pipeline can be viewed and analyzed online using a "dataset cutting tool." The tool allows institutions to disaggregate their own data in a variety of ways — programs taken, race, gender, etc. — and look at customized reports and analyses. When integrated with other databases and survey information, the data provide researchers powerful information to effectively assess program strengths and areas for reform. Such integration includes the ability to identify outcomes of students who are taught by those who leave teacher education programs and either continue in other programs or drop out entirely.

- ▶ **The data go beyond simple input and outcome measures.** While they are enrolled in teacher preparation programs, future teachers take surveys and share information on their preparation experiences. Once they are actually teaching, they are surveyed not only on their perceptions of how well prepared they were, but also on the mentoring, working conditions, compensation and support they received in their first, third and fifth years. Institutions have direct access to these surveys, which they can merge with program information and analyze using custom datasets retrieved through the dataset cutting tool. This provides institutions and the commonwealth with a more accurate picture of the multitude of factors influencing the retention and success of graduates in the field.
- ▶ **The system is not just about compliance — it's about program improvement.** Data collected as part of VITAL are geared toward use by institutions to improve program delivery. Although the data will help institutions meet reporting requirements and provide the commonwealth with new information about the quality of teacher preparation in Virginia, the information is first and foremost about helping preparation programs better understand

how their graduates fare and ensuring they are providing a quality experience.

## Delaware's Multiple Data Systems, Two Reporting Resources

### Enabling School Improvement and Accountability Compliance

Delaware has been working to develop robust systems to support data-driven decisionmaking around local district education program delivery and individual student learning experiences. Recognizing that connecting teacher and student data facilitates both school improvement and efficient accountability compliance, Delaware began linking its student and teacher databases in 2006. However, connecting the data is not sufficient if the information is not easily accessible. In addition to creating the infrastructure to link the two databases, Delaware developed two reporting systems, based on the same data, to empower educators with information to improve student achievement and automate NCLB reporting on highly qualified teachers.

### Connecting Data through Intradepartmental Collaboration

Delaware assigns each teacher a unique ID through its state personnel system, Payroll and Human Resources Statewide Technology (PHRST). This ID provides the link to connect two important databases, eSchoolPLUS (eSP) and the Delaware Educator Data System (DEEDS), which are needed to focus school improvement and teacher quality reporting efforts.

eSP, the statewide pupil accounting system, is the foundation for all data support functions because it houses not only the ID numbers assigned by PHRST for each educator but also unique identification numbers, which are not Social Security Numbers, for each student and staff member within the Delaware educational system. The coding is verified by Department of Education staff and is maintained by the Technology Management and Design Work Group.

## Delaware Data Systems at a Glance

### eSchoolPLUS (eSP)

- ▶ Teachers' class assignments
  - Courses taught by teacher, including NCLB core academic subjects
  - Student enrollment in each course
- ▶ Student demographics
- ▶ Special education, bilingual or ESL student data

### Delaware Educator Data System (DEEDS)

- ▶ Employment history
- ▶ Years of experience
- ▶ Certification/licensure
- ▶ Educational background
- ▶ Praxis I and II scores<sup>5</sup>
- ▶ Highly qualified teacher status
- ▶ Progress in the statewide new teacher induction program

<sup>5</sup>The Praxis Series™ Assessments by Educational Testing Service provide tests and other services that states use as part of their teaching licensing certification process.

However, DEEDS, which houses the certification and licensure databases, is maintained by a different department — the Professional Accountability Work Group. By linking to the unique teacher ID generated by PHRST, DEEDS provides Delaware public and charter school personnel officers and staff with a secure environment to find and review educator information relevant to the hiring, licensure/certification, license maintenance and NCLB compliance processes.

The connection of these two databases provides Delaware with endless possibilities for analyses. However, the state limited the reporting and analyses to enable two important priorities:

- ▶ Using data for school improvement — *Correlates of Achievement* and

- ▶ Facilitating federal reporting requirements for highly qualified teachers.

### ***Using Teacher/Student Data for School Improvement***

The University of Delaware Education Research & Development Center and the Delaware Department of Education have taken the lead in designing and developing *Correlates of Achievement*, a research-based data system that is available to all Delaware school districts. This relational, query-driven data system integrates school-level data with data systems currently within the Delaware Department of Education's data warehouse (the Delaware Student Testing Program, the Delaware Student Information System, and educator data from the state's DEEDS and PHRST databases). The indicator system is designed to assist school- and district-level decisionmakers in their efforts to continuously improve schools and to provide an integrated data system that will focus school-level decisionmaking on closing achievement gaps by empowering school leaders to effectively use data. To accomplish this, *Correlates of Achievement* provides data on areas in need of improvement:

- ▶ curriculum;
- ▶ teacher experience;
- ▶ teacher preparation;
- ▶ class size; and
- ▶ school climate.

The next stage of development for this data system involves not only integrating student achievement indicators but also, and perhaps more important, providing professional development to school data teams. The professional development is being provided by the Delaware Academy for School Leadership in cooperation with the Southern Regional Education Board, the Wallace Foundation and the University of Delaware Education Research & Development Center.

### ***Automating and Improving Federal Reporting on Highly Qualified Teachers***

To determine whether each classroom is led by a highly qualified teacher, teachers who teach core academic subjects take the electronic Teacher Quality Survey through DEEDS. The survey is prepopulated with the teacher's district, school, Delaware and National Board for Professional Teaching Standards certification(s), Praxis II scores, and class schedule. There have been some issues, such as teachers not taking the survey, missing data elements that precluded teachers from taking the survey and unverified surveys. Processes are now in place to eliminate missing data elements. Increased and focused monitoring will address the issues of teachers not taking the survey and districts/charter schools not verifying surveys.

Once the district and charter school staffs verify teachers' surveys and the student test results are available, the Delaware Department of Education staff analyzes the data. The department identifies schools that are not making adequate yearly progress and/or are in school improvement; identifies districts, individual public schools and charter schools in which large percentages of classes are not taught by highly qualified teachers; and identifies any core academic subjects that frequently are not taught by highly qualified teachers. Additional disaggregated analyses also are done, such as looking at the highly qualified teacher data by poverty level at the school or student level, by teacher experience, and by minority status of the school or the students.

### ***Ohio's Statewide Value-Added Rollout An Evolution, Not a Revolution***

Value-added analysis is a statistical method used to measure schools' impact on the academic progress of students and groups of students from year to year. Value-added analysis also has the ability to measure teachers' impact on student growth. In 2002, Battelle for

Kids piloted SOAR, a school improvement collaborative that provides value-added reports on schools and districts, in 42 voluntary Ohio districts. Today, by training educators and administrators to leverage the data to increase student achievement, more than 100 Ohio school districts participate in SOAR — representing approximately 30 percent of the state’s students. In 2003, with support from the leadership of the state’s teachers’ unions, education associations and educators, the bipartisan Ohio House Bill (HB) 3 was passed, which required incorporating value-added assessment into Ohio’s accountability system by the 2007–08 school year. Battelle for Kids is launching a voluntary pilot among the SOAR districts to provide teacher-level value-added reports to improve teacher effectiveness and instruction.

### ***Creating a Network of Professional Development To Maximize Value-Added Data***

Ohio SOAR districts receive complete value-added reporting in grades 3–10, district and building executive summaries of value-added reports, and opportunities to participate in classroom- and high school-level value-added analysis pilots. Because value-added assessment was a new concept to many of the 42 pilot districts, much communication and professional development was needed to ensure educators’ confidence in the accuracy and relevancy of the data. The value-added model chosen by Battelle for Kids was based upon Tennessee’s Value-Added Assessment System (TVAAS),<sup>6</sup> which was established in 1992. Therefore, the chosen methodology had more than 10 years of credibility, lessons learned and professional development, and Battelle for Kids was able to draw upon this political capital to show educators the benefits of the analyses. Additionally, Battelle for Kids offered intensive one-on-one professional development to the initial pilot districts.

With Ohio HB 3 requiring that a value-added progress metric be incorporated into Ohio’s accountability

system by 2007–08, Battelle for Kids and the Ohio Department of Education are leading a comprehensive training program to develop the skills of a cadre of educators who represent the 12 regions across Ohio. Eighty Regional Value-Added Specialists (RVAS) have made a two-year commitment (started in 2005–06) to learn more about value-added’s uses and benefits and to train others to use and interpret value-added information. During the 2006–07 school year, RVAS are training District Value-Added Specialists to use and interpret value-added information. By the time value-added is part of the state accountability system, approximately 1,400 individuals will be trained to use the information to make data-informed decisions about school improvement and increased student achievement.

### ***Expanding Value-Added Reporting to the Teacher Level: Identifying and Sharing Promising Practices***

The statewide accountability system requires only schools and districts to measure and report their value-added progress; however, approximately 40 SOAR districts have expressed interest in receiving teacher-level value-added reports. Therefore, Battelle for Kids plans to complement the statewide school and district value-added progress reports with the Teachers Connecting Achievement & Progress (T-CAP) initiative. This groundbreaking endeavor is Battelle for Kids’ three-year pilot to create and use classroom-level value-added analysis to improve teacher effectiveness and student achievement. For this pilot, Battelle for Kids will collect participating SOAR districts’ student data, link it to individual teachers, and work with principals and teachers to create a comprehensive professional development program to help them effectively interpret and use value-added information for school

<sup>6</sup>TVAAS uses a student’s entire testing history to estimate how the student would have performed in a typical teacher’s classroom this year and then to identify and learn from those teachers whose students perform better than the expected level.

improvement. T-CAP offers districts and educators the opportunity to begin answering questions regarding various school improvement and teacher quality theories. Too often, researchers have been limited to measuring teacher quality by looking at years of experience,

degrees and additional coursework. Now, with longitudinal data linking teacher and student information, SOAR districts will have a clearer picture of the teaching practices that have the most impact on student growth. Educators then can use this information,

## The Promises and Challenges of Value-Added Teacher Quality Data

Many policymakers and school reformers are calling for the use of students' standardized test scores as the primary — and in some cases, sole — means to identify and/or reward effective teachers and root out ineffective ones. Often, they propose rating teacher performance by using a value-added methodology (VAM) that measures how individual teachers influence learning for each child.

VAM draws on new statistical techniques that use multiple years of student achievement data to estimate the effects of schools or teachers. Students are tracked as individuals over time, not as cohorts, and serve as their own controls. By tracking individual students' academic growth over several years and different subjects, researchers can estimate the contributions that teachers make to that growth.

A number of studies using these methods have shown stunning results. For example, William Sanders, a pioneering VAM statistician, found that students assigned to the most effective teachers for three years in a row performed 50 percentile points higher on state tests than did comparable students assigned to the least effective teachers for three years in a row.<sup>7</sup>

VAM offers, in the eyes of some reformers and policymakers, a methodology that can identify reliably and accurately the effect of individual teachers and teacher preparation programs on student achievement. Although VAM holds great promise in multiple areas and states and school districts should consider moving forward in this area, VAM is far from a simple process and requires addressing technical barriers.

In addition, as promising as this new area of research is, there are many challenges to using state test data to determine the effectiveness of individual teachers in most grades and subjects. For example, most standardized tests measure only a small fraction of the “taught” curriculum and would leave many important teachers (e.g., art, music, science, social studies, vocational) out of

the performance-based system. And most tests are not “scaled” in a way that accounts for teacher effects across multiple years in the same subject area. Because properly scaled tests in different grade levels and subject areas and adequate data for individual teachers generally are lacking, *value-added student achievement data from state tests are typically available for no more than about 30 percent of elementary school teachers and perhaps 10 percent of high school teachers.*<sup>8</sup>

Also, all standardized tests have *random error*, which often limits their ability to measure the performance of both students and their teachers — especially when the number of “student observations” is limited in assessing the effects of an individual teacher. Most multiple-choice tests do not assess a wide enough range of abilities to avoid ceiling effects or to capture all the various effects that teachers may have on learning.

Finally, most state and school district data systems do not — and VAM research methods cannot — account for the impact significant amounts of team teaching, pullout programs and student mobility have on the effects of individual teachers on student achievement. In addition, students are not always randomly assigned to teachers, confounding efforts to compare the effects of some teachers with those of others. Research using even the much more sophisticated value-added models shows that some teachers may have much higher value-added scores in one subject than another (e.g., math versus reading), thereby making the identification of effective teachers with just one test score that much more difficult.

<sup>7</sup>Sanders, *Cumulative and Residual Effects*.

<sup>8</sup>These estimates were derived by several analysts and reformers, such as Joan Baratz-Snowden, Linda Darling-Hammond and Brad Jump, who have looked at typical state tests and estimated how many teachers in each state can have value-added assigned to them.

collaborate with others and share best practices to maximize all students' learning.

## **Colorado's Journey to Creating a Teacher ID** Clear Communication and Building on Other States' Good Work To Establish a Unique Teacher ID

As in most states, the various Colorado education agencies — Colorado Department of Education (CDE), Colorado Commission on Higher Education (CCHE) and individual school districts — collect an extensive amount of data on the teacher workforce, including demographics, work assignments, experience, education levels and licensure. Although this information is adequate for providing snapshot information about overall teacher quality at a fixed point in time, issues regarding capacity, accuracy, coordination and accessibility mean that the data are insufficient for the detailed analyses across years that are necessary to effectively monitor teacher quality. In addition, the lack of a mechanism to link teachers to their students makes it impossible to determine teacher contributions to student learning. As a result, Colorado is unable to accurately answer critical questions about the current and emerging workforce, such as:

- ▶ Which teachers are most effective in promoting student achievement?
- ▶ Where do these teachers work in Colorado and why?
- ▶ What policies and programs best support the preparation and development of quality teachers who are most effective in promoting student achievement?
- ▶ Are quality teachers distributed equitably among diverse classrooms?

### *Clear Communication about How Connecting Teacher and Student Data Benefits All Stakeholders*

The drive to establish a unique teacher ID in Colorado has been spearheaded by the Alliance for Quality

Teaching (AQT), a nonprofit that works “to ensure that Colorado children have a quality teacher in every classroom, every day.” AQT began exploring the potential of teacher IDs in fall 2005 to address frustrations with the quality of data on teaching in Colorado. After legislation was blocked in the 2006 legislative session because of mistrust relating to data collection and use, AQT convened a series of four broadly attended meetings in summer 2006 to discuss the potential for a unique teacher ID in Colorado. The goal of the meetings was to bring a wide group of education stakeholders together to improve and clarify communications and:

- ▶ learn more about teacher IDs and their potential by examining lessons learned from other states that have developed similar systems;
- ▶ address concerns about state capacity, resources and use of data; and
- ▶ develop a set of recommendations to use as a framework for actually establishing a statewide unique teacher ID system.

The meeting and subsequent report demonstrate that through an inclusive, open and carefully planned process, Colorado and other states can develop a unique ID and a structure for using the data that is fair, valid and useful. As a result of AQT's outreach, Colorado has legislation pending to improve information around teacher quality by establishing a unique teacher ID.

### *Current Legislation To Improve Data on Teacher Quality and Student Achievement*

- ▶ **HB 1048.** Recognizing that Colorado needs to enhance its education data systems to improve student performance, the state has embarked on a process of developing a longitudinal student data system. Recently signed into law by Gov. Ritter, HB 1048 calls for the creation of a longitudinal data system to measure individual student growth on the Colorado Student Assessment Program standardized tests.

► **Senate Bill (SB) 140.** SB 140 calls for the creation of a commission whose duties include developing a unique teacher ID protocol and a method for integrating the identifier into current and emerging databases. While still very early in the legislative process,

SB 140 has drawn some strong support and — with adjustments to clarify statutory language and ensure appropriate use of data — has a real chance of passing.

## Conclusion

Ensuring that every student is taught by a highly qualified teacher is increasingly becoming a national priority, and collecting and using longitudinal data must be an integral part of this effort. The ability to connect teacher preparation, training and practices with student success will focus the conversation on strategies that have been

proven to increase student achievement. Fortunately, many states are providing clear roadmaps to build these longitudinal teacher data systems that are connected to student information and are illustrating the benefits of these analyses to improve teacher and teaching quality.

## Initiatives To Watch

### **American Board for Certification of Teacher Excellence (ABCTE), *Teacher Shortages: Data Sources***

[www.abcte.org/teacher\\_shortages](http://www.abcte.org/teacher_shortages)

This Web site shares what ABCTE has learned through investigating the status of teacher shortages. Because it did not find comprehensive data systems in all states or one organization that identified all potential sources for specific state-by-state data and research reports, ABCTE also provides on this Web site comprehensive data reports from disparate sources on teacher shortages. Readers are invited to contribute suggestions so that the information contained in the site will continue to improve.

### **Battelle for Kids Value-Added Initiatives**

[http://battelleforkids.com/home/value\\_added](http://battelleforkids.com/home/value_added)

Battelle for Kids serves as a national leader in providing educators with professional development, consulting, training, tools and resources around the effective use of value-added analysis to improve teaching and learning. Housing one of the largest value-added initiatives in the country, Battelle for Kids has created a model for implementing value-added at the state, district and school levels with the ability to connect value-added information to other school improvement initiatives.

### **Center for Teaching Quality, *Teaching Quality Data Systems Roadmap***

[www.teachingdata.org](http://www.teachingdata.org)

Travel down the roads of teacher preparation institutions, schools and students to learn how to build an ideal teacher quality data system — avoiding wrong turns, heeding warning signs, and arriving at a destination that is fair and reliable for teachers and the students they serve.

### **National Center for Analysis of Longitudinal Data in Education Research**

[www.caldercenter.org/index.cfm](http://www.caldercenter.org/index.cfm)

CALDER capitalizes upon longitudinal individual-level student and teacher data across a number of states to investigate how state and local policies, especially teacher policies, governance policies and accountability policies, affect teachers (e.g., who teaches what

students) and students (e.g., academic achievement and attainment). Working papers:

#### ► **Florida**

- *Teacher Training, Teacher Quality, and Student Achievement*
- *The Effects of NBPTS-Certified Teachers on Student Achievement*

#### ► **North Carolina**

- *How and Why Do Teacher Credentials Matter for Student Achievement?*
- *High Poverty Schools and the Distribution of Teachers and Principals*

### **National Comprehensive Center for Teacher Quality, *TQ Source***

[www.tqsource.org](http://www.tqsource.org)

The TQ Source is a comprehensive national source on teacher quality, providing a multitude of resources and information on several different teacher quality topics, including user-customized graphs and tables based on reliable data.

### **National School Public Relations Association (NSPRA)**

[www.nspr.org](http://www.nspr.org)

NSPRA provides communication training and services to school leaders in the United States, Canada and the worldwide U.S. Dependent Schools. NSPRA's mission is to advance education through responsible communication.

### **Teacher Development Regional Database Collaborative (TDRDC)**

[www.cftl.org/initiatives\\_TDRDC.php](http://www.cftl.org/initiatives_TDRDC.php)

The primary goal of TDRDC is to strengthen California's teacher workforce through regional, data-driven collaborations among K–18 educational institutions. TDRDC will help regional leaders build and maintain a data-driven decisionmaking system that facilitates the collection and analysis of current-year research; illuminates teacher workforce issues; and develops and maintains an ongoing capacity to address teacher supply and demand and the quality of the teacher workforce. To date, there are two TDRDCs in California: the Kern County Initiative for Recruiting, Preparing and Retaining Highly Qualified and Effective Teachers and the Teacher Workforce Initiative in the tri-county region of Monterey, San Benito and Santa Cruz.

*(continued on next page)*

## Initiatives To Watch (*continued*)

### Teacher Preparation Accountability System

<http://asa.regents.state.la.us/TE/accountability>

In compliance with the Higher Education Act of 1998, Louisiana created a Teacher Preparation Accountability System to assess the performance of teacher preparation programs within the state. During the first phase (2001–02), the performance of regular and alternate certification students on the state teachers' examination (PRAXIS) was assessed. During the second phase (2002–03), the number of people who completed the program and the performance of each institution are being assessed. In the future, additional factors will be assessed to examine such areas as ratings of programs by first-year teachers' mentors, retention of teachers after three years of teaching and university-district partnerships.

### Teacher Quality Partnership (TQP)

[www.teacherqualitypartnership.org](http://www.teacherqualitypartnership.org)

TQP, a research consortium of the 50 Ohio colleges and universities that provide teacher preparation programs, is conducting a comprehensive, longitudinal study of the preparation, in-school support and effectiveness of Ohio teachers. The partnership is identifying how the preparation and development of new teachers affect their success in the classroom as measured by the academic performance of their students.

### Teachers for a New Era, *Virtual Library*

[www.teachersforanewera.org/index.cfm?fuseaction=publications.virtualLibHome](http://www.teachersforanewera.org/index.cfm?fuseaction=publications.virtualLibHome)

Catalogued by design principle, including decisions driven by evidence, the virtual library is searchable by principle and by “free text” to make it simple for users to search for materials that contain a particular word or phrase in the document summary. The library currently includes more than 600 publications related to improving teacher quality and student achievement.

### Tri-State Partnership

[www.wcer.wisc.edu/publications/workingPapers/Working\\_Paper\\_No\\_2006\\_1.pdf](http://www.wcer.wisc.edu/publications/workingPapers/Working_Paper_No_2006_1.pdf)

Michigan, Minnesota and Wisconsin, in partnership with the Wisconsin Center for Education Research, won a Statewide Longitudinal Data System Grant from the U.S. Department of Education's Institute of Education Sciences to create a multistate longitudinal data system. This will enable education stakeholders to conduct value-added and other diagnostic and policy-relevant evaluation research and engage in data-informed decisionmaking, with the ultimate goal of strengthening teaching and improving student achievement for all students and all schools.

## Selected Further Reading

Alliance for Quality Teaching, *Addressing the Need for Better Data on Teaching in Colorado: Unique Teacher Identifier: Stakeholder Process Report*, 2007.

<http://aqt.civicore.com/Modules/Resources/Resources/69.pdf>

Alliance for Quality Teaching, *Shining the Light: The State of Teaching in Colorado*, 2006.

[www.qualityteaching.org](http://www.qualityteaching.org)

The Aspen Institute, *Commission Staff Research Report: Growth Models: An examination within the context of NCLB*, 2006.

[www.aspeninstitute.org/atf/cf/{DEB6F227-659B-4EC8-8F84-8DF23CA704F5}/Growth%20Models%20and%20NCLB%20Report.pdf](http://www.aspeninstitute.org/atf/cf/{DEB6F227-659B-4EC8-8F84-8DF23CA704F5}/Growth%20Models%20and%20NCLB%20Report.pdf)

The Brookings Institution: The Hamilton Project, *Identifying Effective Teachers Using Performance on the Job*, 2006.

[www.brookings.edu/views/papers/200604hamilton\\_1.htm](http://www.brookings.edu/views/papers/200604hamilton_1.htm)

The Center for the Future of Teaching and Learning, *Strengthening California's Teacher Information System*, 2002.

[www.cftl.org/documents/CFTLdatabasepdf.pdf](http://www.cftl.org/documents/CFTLdatabasepdf.pdf)

Center for Teaching Quality, *Teacher Working Conditions Are Student Learning Conditions: A Report on the 2006 North Carolina Teacher Working Conditions Survey*, 2007.

[www.teachingquality.org/pdfs/twnc2006.pdf](http://www.teachingquality.org/pdfs/twnc2006.pdf)

Center for Teaching Quality, Goldhaber, D., *Key Attributes of State Data Systems That Allow for Sophisticated Research on Teachers*, 2005.

[www.teachingdata.org/pdfs/goldhaber\\_data.pdf](http://www.teachingdata.org/pdfs/goldhaber_data.pdf)

Center for Teaching Quality, Goldberg, B., *Linking Professional Development to Teacher Practice, Student Learning and Costs*, 2005.

[www.teachingdata.org/pdfs/goldberg.pdf](http://www.teachingdata.org/pdfs/goldberg.pdf)

Educational Testing Service, Brawn, H., *Using Student Progress To Evaluate Teachers: A Primer on Value-Added Models*, 2005.

[www.ets.org/Media/Research/pdf/PICVAM.pdf](http://www.ets.org/Media/Research/pdf/PICVAM.pdf)

The Education Trust, "The Real Value of Teachers: If good teachers matter, why don't we act like it?," *Thinking K-16*, 2004.

[www2.edtrust.org/NR/rdonlyres/5704CBA6-CE12-46D0-A852-D2E2B4638885/0/Spring04.pdf](http://www2.edtrust.org/NR/rdonlyres/5704CBA6-CE12-46D0-A852-D2E2B4638885/0/Spring04.pdf)

National Association of State Boards of Education, *Evaluating Value-Added*, 2005.

[www.nasbe.org/recent\\_pubs/Value%20added%20exec%20summary.pdf](http://www.nasbe.org/recent_pubs/Value%20added%20exec%20summary.pdf)

National Comprehensive Center for Teacher Quality, *Planning Tool to Provide Evidence of Progress Toward Equitable Teacher Distribution*, 2006.

[www.nctq.org/TeacherDistributionPlanningTool2.pdf](http://www.nctq.org/TeacherDistributionPlanningTool2.pdf)

National Comprehensive Center for Teacher Quality, *Revising State Highly Qualified Teacher Plans — Answers to Commonly Asked Questions*, 2006.

[www.nctq.org/webcasts/hqtPlans/hqtFAQ.pdf](http://www.nctq.org/webcasts/hqtPlans/hqtFAQ.pdf)

Rand Corporation, *Evaluating Value-Added Models for Teacher Accountability*, 2003.

[www.rand.org/pubs/monographs/2004/RAND\\_MG158.pdf](http://www.rand.org/pubs/monographs/2004/RAND_MG158.pdf)

Schools Interoperability Framework Associations, *SIF Implementation Specification 2.0 and the SIF Reporting Web Services Specification 1.0*, accessed Feb. 27, 2007.

[www.sifinfo.org/sif-specification.asp](http://www.sifinfo.org/sif-specification.asp)

Southern Regional Education Board, *From Goals to Results: Improving Education System Accountability*, 2006.

[www.sreb.org/main/Goals/Publications/System\\_Accountability.asp](http://www.sreb.org/main/Goals/Publications/System_Accountability.asp)

State Higher Education Executive Officers, *Data Systems to Enhance Teacher Quality*, 2003.

[www.sheeo.org/quality/data%20sys.pdf](http://www.sheeo.org/quality/data%20sys.pdf)

This issue brief was released in conjunction with the DQC Quarterly Issue Meeting held in March 2007 on the same topic. Please visit the DQC Web site at [www.DataQualityCampaign.org](http://www.DataQualityCampaign.org) to view the video of that meeting and materials.

The authors wish to thank the DQC's managing partners and the DQC Teacher ID Subcommittee for their collaboration on shaping the issue brief and session:

**Jacki Paone and Vincent Badolato**, *Alliance for Quality Teaching*  
**Carol Smith**, *American Association of Colleges for Teacher Education*  
**Patricia Brennan-Gac**, *American Board for Certification of*

*Teacher Excellence*

**Heidi Glidden**, *American Federation of Teachers*

**Jim Mahoney and Suzanne Amos**, *Battelle for Kids*

**Robin Taylor**, *Delaware Department of Education*

**Daria Hall**, *The Education Trust*

**Rick Eiserman**, *Georgia Professional Standards Commission*

**Arie van der Ploeg**, *Learning Point Associates*

**Peter Donovan and Martha Gage**, *National Association of State  
Directors of Teacher Education Certification*

**Laura Goe and Cortney Rowland**, *National Comprehensive Center on  
Teacher Quality*

**Shari Francis**, *National Council for Accreditation of Teacher Education*

**Tod Massa**, *State Council of Higher Education for Virginia*

**Dan Fallon**, *Teachers for a New Era*

**Audrey Noble**, *University of Delaware*

**Bethann Canada**, *Virginia Department of Education*



The Data Quality Campaign is a national, collaborative effort to encourage and support state policymakers to improve the collection, availability and use of high-quality education data and to implement state longitudinal data systems to improve student achievement. The campaign aims to provide tools and resources that will assist state development of quality longitudinal data systems, while providing a national forum for reducing duplication of effort and promoting greater coordination and consensus among the organizations focusing on improving data quality, access and use.

**Managing partners of the Data Quality Campaign include:**

- ▶ Achieve, Inc.
- ▶ Alliance for Excellent Education
- ▶ Council of Chief State School Officers
- ▶ Education Commission of the States
- ▶ The Education Trust
- ▶ National Association of State Boards of Education
- ▶ National Association of System Heads
- ▶ National Center for Educational Accountability
- ▶ National Center for Higher Education Management Systems
- ▶ National Governors Association Center for Best Practices
- ▶ Schools Interoperability Framework Association
- ▶ Standard & Poor's School Evaluation Services
- ▶ State Educational Technology Directors Association
- ▶ State Higher Education Executive Officers

**Endorsing partners of the Data Quality Campaign include:**

- ▶ ACT
- ▶ Alliance for Quality Teaching
- ▶ American Association of Colleges for Teacher Education
- ▶ American Association of State Colleges and Universities
- ▶ American Board for Certification of Teacher Excellence
- ▶ APQC
- ▶ Center for Teaching Quality
- ▶ College Summit, Inc.
- ▶ Consortium for School Networking
- ▶ Educational Policy Institute
- ▶ GreatSchools
- ▶ Jobs for the Future
- ▶ League of Education Voters Foundation
- ▶ Learning Point Associates
- ▶ National Alliance for Public Charter Schools
- ▶ National Association of Secondary School Principals
- ▶ National Education Knowledge Industry Association
- ▶ Pathways to College Network
- ▶ Postsecondary Electronic Standards Council
- ▶ Roads to Success
- ▶ Southern Regional Education Board

For more information about the Data Quality Campaign, please visit [www.DataQualityCampaign.org](http://www.DataQualityCampaign.org).

© Copyright 2007. Council of Chief State School Officers and Data Quality Campaign. All rights reserved.